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A REVIEW ON AN OVERVIEW ON CURRENT METHOD IN BUCCAL PATCHS

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Abstract

Bypassing the hepatic first pass metabolism and gaining direct access to systemic circulation through the internal jugular vein, buccal medication delivery offers great bioavailability. An appealing method of administration for systemic medication delivery is the buccal route. For the treatment of numerous illnesses, buccal bioadhesive films provide special benefits over conventional dosage forms by delivering topical medications into the oral cavity at a gradual and controlled rate. Reviewing recent advancements in the buccal adhesive drug delivery system, this essay aims to give young scientists fundamental concepts that will help them get around the challenges of formula creation.

Introduction

Buccal patches are described as laminates comprised of an impermeable backing layer, adrug: containing reservoir layer which releases the drug in a controlled manner, anda mucoadhesive surface for mucosal attachment [1, 2].

Amongst the various route of administration tried so far in the novel drug delivery systems, localized drug delivery to tissues of the oral cavity has been investigated for the treatment of periodontal disease, bacterial and fungal infection. Over the decades mucoadhesion has become popular for its potential to optimize localized drug delivery by retaining a dosage form at the site of action(eg.with in the gastrointestinal tract) or systemic delivery by retaining the formulation in intimate contact with the absorption site (eg.buccal cavity). Well defined bio adhesion is the ability of amaterial (synthetic or biological) to adhere to a biological tissue for an extended period of time the biological surface can be epithelial tissue or it can be mucus coat on the surface of a tissue [3,4]. If adhesion is to a mucous coat, the phenomenon is referred to as mucoadhesion. The use of mucoadhesive polymers in buccal drug delivery has a greater application. Various mucoadhesive devices including tablets, films, patches, disks, strips, ointments and gels, have recently been developed. However, buccal patch offers greater flexibility and comfort than the other devices. In addition, a patch can circumvent the problem of the relatively shot [5-7].

Objective [8-15]

To review the current states of buccal patchtechnology and its applications in drug delivery to discuss the advantages and limitations of buccal patches as a drug delivery system to provide an overview of the various materials and techniques used in the fabrication of buccal patches.

To examine the current methods for evaluating the performance and efficacy of buccalpatches, to identify the challenges and further directions for research in buccal patch technology summarize the current regulatory guide lines and requirements for the development and approval of buccal patches.

To discuss the potential applications of buccal patches in various therapeutic areas such as pain management, infectious diseases, and oral health

To prove an overview of the commercialization and market for buccal patches

Advantages [9, 10, 16-22]

1. The oral mucosa is well-perfused with blood. Oral cavity drugs absorption occurs through oral mucosa. It is carried through the deep lingual or facial vein into the internal jugular vein, brachiocephalic vein and into systemic circulation.
2. Buccal administration, the drug gains direct entry into the systemic circulation thereby bypassing the first pass effect. Contact with the digestive fluids of gastrointestinal tract is avoided which might be unsuitable for stability of many drugs like insulin or other proteins, peptides and steroids. In addition

Limitations in buccal patches [3, 22-29]

- The area of absorptive membrane is relatively smaller. If the effective area for absorption is dictated by the dimensions of a delivery system, this area then becomes even smaller.
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- Saliva is continuously secreted into the oral cavity diluting drugs at the site of absorption resulting in low drug concentrations at the surface of the absorbing membrane. Involuntary swallowing of saliva results in a major part of dissolved or suspended released drug being removed from the site of absorption. Furthermore, there is risk that the delivery system itself would be swallowed.
- Drug characteristics may limit the use of the oral cavity as a site for drug delivery. Taste, irritancy, allergy and adverse properties such as discoloration or erosion of the teeth may limit the drug candidate list for this route. Conventional type of buccal drug delivery systems did not allow the patient to concurrently eat, drink or in some cases, talk

Pharmaceutical applications [16, 30-32]

1. Pain Management

Buccal patches can be used to deliver opioids and other analgesics for pain management, providing a rapid onset of action and minimizing gastrointestinal side effects.

2. Anti-Emetics

Buccal patches can be used to deliver anti-emetic medications, such as ondansetron, to prevent nausea and vomiting associated with chemotherapy, radiation therapy, and postoperative recovery.

3. Cardiovascular Medications

Buccal patches can be used to deliver cardiovascular medications, such as nitroglycerin, to provide rapid relief from angina symptoms.

4. Hormone Replacement Therapy (HRT)

Buccal patches can be used to deliver hormones, such as estrogen and testosterone, for HRT, providing a convenient and non-invasive alternative to traditional oral or injectable formulations.

5. Insomnia Treatment

Buccal patches can be used to deliver sedative-hypnotic medications, such as zolpidem, to treat insomnia, providing a rapid onset of action and minimizing morning grogginess.

6. Migraine Treatment

Buccal patches can be used to deliver triptans and other migraine medications, providing a rapid onset of action and minimizing gastrointestinal side effects.

7. Nicotine Replacement Therapy (NRT)

Buccal patches can be used to deliver nicotine to help smokers quit, providing a convenient and non-invasive alternative to traditional gum or lozenge formulations.

8. Opioid Dependence Treatment

Buccal patches can be used to deliver buprenorphine and other opioid dependence medications, providing a convenient and non-invasive alternative to traditional oral or injectable formulations.

9. Parkinson's Disease Treatment

Buccal patches can be used to deliver dopamine agonists and other Parkinson's disease medications, providing a convenient and non-invasive alternative to traditional oral or injectable formulations.

10. Sexual Dysfunction Treatment

Buccal patches can be used to deliver phosphodiesterase type 5 (PDE5) inhibitors, such as sildenafil, to treat erectile dysfunction, providing a rapid onset of action and minimizing gastrointestinal side effects.

Methods of preparation [5, 8, 33-38]

Two methods are used to prepare adhesive patches.

1. Solvent Casting

In this method, all patch excipients including the drug co-dispersed in an organic solvent and coated onto a sheet of release liner. After solvent evaporation a thin layer of the protective backing material is laminated onto the sheet of coated release liner to form a laminate that is die-cut to form patches of the desired size and geometry

2. Direct Milling

This, patchesare manufactured without the use of solvents. Drug and excipients are mechanically mixed by direct milling or by kneading, usually without the presence of any liquids. After the mixing process, the resultant material is rolled on a release liner until the desired thickness is achieved. The backing material is then laminated as previously described.[10] While there are only minor or even no differences in patch performance between patches fabricated by the two processes, the solvent-free process is preferred because there is no possibility of residual solvents and no associate solvent-health issues.

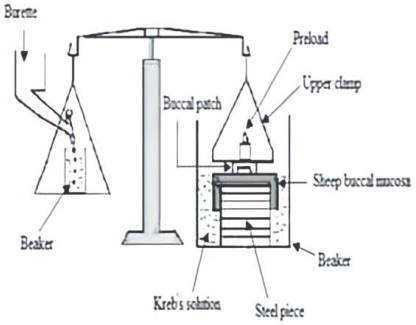

Figure 1: Measurement of Mucoadhesive Strength

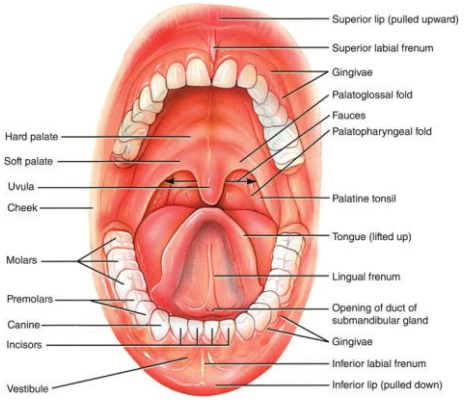

Figure 2: Anatomy of Mouth

Conclusion

The buccal mucosa offers several advantages for controlled drug delivery for extended periods of time. The mucosa is well supplied with both vascular and lymphatic drainage and first-pass metabolism in the liver and pre-systemic elimination in the gastrointestinal tract are avoided. The area is well suited for a retentive device and appears to be acceptable to the patient. Buccal drug delivery is an exciting area to be pursued further in the direction of systemic delivery of orally inefficient drugs and a feasible and attractive alternative in non-invasive delivery of potent peptide and protein drug molecules. The necessity of safe and effective buccal permeation/absorption enhancers is an important component for a potential future in the field of buccal drug delivery.

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Conflict of Interest

No Conflict of interest

Informed Consent and Ethical Statement

Not Applicable.

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